R E P O R T R E S U M E S

ED 016 962 48 AL 000 934

THE RELATION BETWEEN ASSOCIATION AND SYNTAX IN SENTENCE PRODUCTION.

BY- ROSENBERG, SHELDON
MICHIGAN UNIV., ANN ARBOR,CTR.FOR RES.LANG.AND BEH

REPORT NUMBER BR-6-1784 PUB DATE SEP 67
CONTRACT OEC-3-6-061784-0508
EDRS PRICE MF-$0.25 HC-$0.32 6P.

DESCRIPTORS- #ASSOCIATION (PSYCHOLOGICAL), #SYNTAX, SENTENCES, BEHAVIORAL SCIENCE RESEARCH, NOMINALS, VERBAL STIMULI, PALERMO JENKINS FREE ASSOCIATION NORMS,

THIS STUDY WAS CONCERNED WITH THE SYNTACTIC RELATIONSHIPS WITHIN WHICH ASSOCIATIVELY RELATED AND ASSOCIATIVELY UNRELATED NOUNS APPEAR IN SENTENCE PRODUCTIONS. TWENTY SS (SUBJECTS) WERE ASKED TO WRITE SENTENCES THAT CONTAINED FOUR NOUNS. THE HIGH ASSOCIATION (HA) SS WERE GIVEN GROUPS OF ASSOCIATIVELY RELATED NOUNS, AND THE LOW ASSOCIATION (LA) SS WERE GIVEN GROUPS OF ASSOCIATIVELY UNRELATED NOUNS. THE RESULTS INDICATED THAT HA NOUNS TEND TO OCCUR AS IDENTICAL CONSTITUENTS OF THE SAME UNDERLYING SENTENCE, WHILE LA NOUNS TEND TO OCCUR IN DIFFERENT UNDERLYING SENTENCES. THESE RESULTS CONFIRMED THE RESULTS OF A PREVIOUS STUDY IN WHICH SS WERE ASKED TO WRITE STORIES THAT INCLUDED EITHER HA OR LA NOUNS. THIS REPORT APPEARS IN "STUDIES IN LANGUAGE AND LANGUAGE BEHAVIOR, PROGRESS REPORT V," SEPTEMBER 1, 1967. (AUTHOR/AMM)

BR 6-1784
PA 48

ED016962

The Relation Between Association and Syntax in Sentence Production[1]

Sheldon Rosenberg

Center for Research on Language and Language Behavior
University of Michigan

This study was concerned with the syntactic relationships within which associatively related and associatively unrelated nouns appear in sentence productions. 20 Ss were asked to write sentences that contained 4 nouns. The high association (HA) Ss were given groups of associatively related nouns, and the low association (LA) Ss were given groups of associatively unrelated nouns. The results indicated that HA nouns tend to occur as identical constituents of the same underlying sentence, while LA nouns tend to occur in different underlying sentences. These results confirmed the results of a previous study in which Ss were asked to write stories that included either HA or LA nouns.

In a previous study (Rosenberg, 1967), Ss were asked to write stories which included certain nouns. Half the Ss were given a list of nouns (in random order) that contained eight groups of four associatively related (according to free association norms) items, while the rest were given a list that contained eight groups of four associatively unrelated items. One of the findings of this study was that associatively related nouns that occurred in the same complex sentence were more likely than their low association (LA) counterparts to appear as a subject or predicate-noun compound (to have shared privileges of occurrence in the same underlying simple sentence). The LA nouns, on the other hand, were more likely to appear in different underlying sentences than the high association (HA) items.

The chief characteristic of the story production task was that no restrictions were placed on the number of key items or on the particular key items that could be included in a sentence. Under these conditions, there was a general tendency for the clusters of key items (regardless of association) that appeared in the same sentence to be larger in the case of HA items than they were in the case of LA items. For this reason, it was felt that the production study should be replicated using a task which

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

AL 000 934

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

would require Ss to generate sentences that contained an equal number of associatively related or associatively unrelated nouns. For this purpose, a sentence production task was designed which required Ss to generate sentences that contained four associatively related nouns or four associatively unrelated nouns. And in order to further restrict performance, Ss were required to use the nouns in each quadruplet (Q) in the order in which they were printed on the pages of their booklets.

In view of the relations between association and syntax that were noted in the previous study (Rosenberg, 1967), it was anticipated that under the conditions of the present study, the sentences produced by LA Ss would contain a larger number of underlying sentences (simple subject-predicate constructions) than the sentences produced by HA Ss.

Method

Subjects. The Ss were 20 paid volunteers from undergraduate introductory psychology classes. They were selected at random from an S pool and were assigned alternately to two groups of 10 Ss each as they appeared for the experiment.

Materials. Each S was given a booklet that contained 14 pages. Across the top of each page was printed a series of four nouns, below which there were four blank lines. Half the booklets contained 14 series of four associatively related nouns (e.g., needle thread pin sewing, king queen ruler crown), and half of them contained 14 series of four associatively unrelated nouns (e.g., needle metal hat violin, king nurse leader plane). Each HA quadruplet (Q) contained an item in common with its LA counterpart. The order of pages in the booklets was varied, but the order of nouns within each HA and LA Q was the same for all Ss. The items that were common to the HA and LA Q's were stimulus words selected from the Palermo-Jenkins (1964) free association norms for college students. The three remaining nouns in each HA Q were selected from among the most frequently occurring responses of the stimulus nouns, while their LA counterparts were either idiosyncratic responses or items that did not occur at all as responses to the stimulus items in question. The LA responses were comparable to their HA counterparts in Thorndike-Lorge (1944) frequency (primarily AA and A words) and in length, and they

were matched as closely as possible with their HA counterparts on such general linguistic markers as animate-inanimate, human-nonhuman, mass-count and abstract-concrete. With only two exceptions, each HA and LA Q contained at least three nouns with the markers in question in common. The exceptions were instances in which two of the nouns had identical syntactic privileges of occurrence. The intent, of course, was to have nouns within each HA and LA Q which share syntactic privileges of occurrence. Thus, king, queen and ruler, and king, nurse and leader can each occur as a subject or as a predicate-noun.

Procedure. The data were collected in a classroom in a group-testing situation. The Ss had 40 min. to complete the task, and all were able to do so. The task instructions were identical for the HA and LA conditions. The Ss were told that their task was to make up sentences that contained the nouns that were printed at the top of each page of their booklets. Each S wrote one sentence for each of the Q's. The only restrictions placed upon their task were the following: (a) each sentence had to include all of the nouns from the top of the page,(b) the words in a Q, regardless of what appeared between them, had to appear in the sentence productions in the order in which they were printed on the page of the booklet, and (c) no noun could be used more than once in its sentence.

Results and Discussion

Sentence length. The means for the average length of the 14 sentences produced by the Ss in Groups HA and LA, respectively, were, 23.28 and 24.38. This difference did not even approach significance, a finding which is consistent with the results for sentence length of the story production study (Rosenberg, 1967).

Number of underlying sentences. All of the sentences produced by the Ss of the present study were sentences which were generated by combining simple sentences. In order to study the relationship between association and syntax, it was first necessary to identify these underlying sentences, and for this purpose, the list of basic English sentence structures proposed by Roberts (1962) was used. Thus, using Robert's basic sentence structures, a sentence such as

> A needle, thread and pin are helpful if you want to do some sewing

would be reduced to

A needle is helpful
A thread is helpful
A pin is helpful
You want to do some sewing.

Notice that in this manner one is not only able to determine number of underlying sentences, but the syntactic relationship between needle, thread and pin as well.

The measure of interest at this point is the average number of underlying sentences for the 14 sentence productions. The mean for Group HA on this measure was 8.82, and for Group LA, 8.94. Clearly, the two groups did not differ significantly on this measure, a finding which is not consistent with what had been anticipated from the results of the story production study (Rosenberg, 1967). The reason for the present result is not apparent, but perhaps a form of type-token analysis of the underlying strings might produce positive findings.

It is interesting to note in the present context that the two groups did not differ in number of underlying sentences (summed over the 14 productions) that did not contain any key items. The means for Groups HA and LA, respectively, on this measure were 34.50 and 35.80.

Associative-syntactic relationships. The underlying sentences that contained the HA and LA items were examined to determine the syntactic relationships within which the HA and LA items appeared. It will be recalled that in the story production study, associatively related nouns tended to appear more frequently as identical constituents of the same underlying sentence (as in the example above) than associatively unrelated nouns. This, of course, is the case that exists when we have a compound subject or a compound predicate-noun. The mean per cent occurrence of compounds in the underlying sentences that contained the key items was 36.60 in Group HA and 15.00 in Group LA. This difference was found to be highly significant, $t(18) = 5.24$, $p < .001$, one-tailed.

The story production study also revealed that LA nouns that occur in the same complex sentence are more likely to appear in different underlying sentences than their HA counterparts. The mean per cent occurrence of key items in different underlying sentences in the present study was 44.40 for Group HA and 64.10 for Group LA. The value of $t(18)$ for this comparison was found to be 3.59, $p < .005$, one-tailed.

As was the case in the previous study (Rosenberg, 1967), the HA and LA nouns appeared very rarely in a direct-indirect object relationship, and the two groups did not differ in the mean per cent occurrence of underlying sentences in which key items appeared in a subject/predicate-noun relationship. The means in question were, for Groups HA and LA, respectively, 18.20 and 19.30.

Conclusion. In spite of the relatively small number of Ss that was used in the present study and the constraints that were placed upon performance, it is possible from the magnitude of the significant effects obtained, to offer strong support for the results of the story production study (Rosenberg, 1967). The relationship that was noted previously between association and syntax appears to be a reliable one.

From a theoretical standpoint, the results of the present study, as well as the results of the previous one, offer additional support to the growing tendency to reject formulations which treat the facts of word association apart from the facts of linguistic structure.

References

Palermo, D. S., & Jenkins, J. J. *Word association norms: grade school through college.* Minneapolis: University of Minnesota Press, 1964.

Roberts, P. *English sentences.* New York: Harcourt, Brace & World, 1962.

Rosenberg, S. Associative clustering in the production of connected discourse. *Studies in language and language behavior, V,* Sept. 1, 1967, Center for Research on Language and Language Behavior, University of Michigan, Contract OEC-3-6-061784-0508 with the U. S. Department of H. E. W., Office of Education.

Thorndike, E. L., & Lorge, I. *The teacher's word book of 30,000 words.* New York: Columbia University Teachers College, 1944.

Footnote

[1]The research reported herein was performed pursuant to Contract OEC-3-6-061784-0508 with the U. S. Department of H. E. W., Office of Education, under the provisions of P.L. 83-531, Cooperative Research, and the provisions of Title VI, P.L. 85-864, the Office of Education as amended. This research report is one of several which have been submitted to the Office of Education as *Studies in language and language behavior, Progress Report V,* September 1, 1967.